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**PATENT ABSTRACTS OF JAPAN**(21) Application number: **11079180**(51) Intl. Cl.: **G11B 5/39**(22) Application date: **24.03.99**

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**(54) SPIN VALVE SENSOR  
FIXING MAGNETIZATION  
WITH CURRENT**

(57) Abstract:

PROBLEM TO BE SOLVED: To obtain satisfactory bias characteristics and a high output by enlarging the quantity of magnetization on a third ferromagnetic layer in comparison with the quantity of magnetization defined by the product of the saturation magnetic flux density and thickness of a second ferromagnetic layer and impressing a detecting current perpendicular to the direction of a magnetic field to be sensed.

SOLUTION: Arrows 601-603 showing the direction of uniaxial magnetic anisotropy on the first, second and third ferromagnetic layers is set parallel to the direction of the magnetic field to be sensed and an arrow 604 showing the direction of uniaxial magnetic anisotropy on a soft magnetic free layer is set vertical to that direction. A sensing current 61

for detecting electric resistance is impressed vertically to a direction 65 of the magnetic field to be sensed so that the magnetic field of current bias can be generated in a direction 66 turning to right. Arrows 68, 71, 72 and 67 showing the directions of magnetization on the first, second and third ferromagnetic layers and the soft magnetic free layer are stably arranged by operating the magnetization quantity of the first, second and third ferromagnetic layers, the current bias magnetic field and the magnetic anisotropy.

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